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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/650,728

08/29/2003

Hiroyuki Saito

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09/21/2005

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EXAMINER

MRUK, GEOFFREY S

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/650,728		SAITO ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Geoffrey Mruk		2853	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 June 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5 and 8-20 is/are pending in the application.
- 4a) Of the above claim(s) 6 and 7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 8-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/26/03 4/19/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Claims 6 and 7 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 23 June 2005.

### ***Claim Objections***

Claim 10 is objected to because of the following informalities:

Claim 10 lacks antecedent basis for the control of first and second motors in the apparatus of claim 1.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 8, 9, 14, 15, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Saito (US 5,998,956).

With respect to claim 1, Saito discloses a printing apparatus (Fig. 1) which prints using a printhead (Fig. 1, element 1), wherein a printing controller (Fig. 3) for feedback-controlling driving of the printing apparatus comprises:

- control information generation means (Fig. 3, element 104) for generating control information for controlling driving of a motor (Fig. 3, element 3) on the basis of a first driving pattern (Fig. 3, element 108a);
- comparison means (Fig. 6, element 604) for comparing the control information and a threshold for determining an overload on driving of the motor (Column 4, lines 58-67); and
- setting means (Fig. 6, element 608) for setting a second driving pattern (Fig. 3, element 108b), instead of the first driving pattern on the basis of a comparison result of said comparison means (Column 5, lines 1-19).

With respect to claim 2, Saito discloses the control information generation means (Fig. 3, element 104) updates the control information in order to compensate for a deviation between the first driving pattern (Fig. 3, element 108a), and feedback information for driving of the motor (Fig. 3, element 3) that is detected by detection means (Column 4, lines 29-33).

With respect to claim 3, Saito discloses the control information includes a voltage value PWM-controlled to drive the motor (Column 5, lines 52-61).

With respect to claim 4, Saito discloses the setting means (Fig. 6, element 608) sets the second driving pattern (Fig. 3, element 108b) to the first driving (Fig. 3, element

108a) pattern again at a timing when the overload on the motor is canceled or predicted to be canceled (Column 5, lines 32-61).

With respect to claim 5, Saito discloses the printing apparatus further comprises storage means (Fig. 3, element 3) for storing the first and second driving patterns (Fig. 3, element 108) as a driving pattern generated in advance, and said setting means can select (Fig. 3, element 101) and set a driving pattern stored in said storage means.

With respect to claim 8, Saito discloses the control information (Fig. 3, element 104) exceeds the threshold from the comparison result (Fig. 3, element 107) of said comparison means, said setting means sets a lower-velocity driving pattern than the first driving pattern as a driving pattern for driving the motor (Column 4, lines 36-67).

With respect to claim 9, Saito discloses the control information (Fig. 3, element 104) does not exceed the threshold from the comparison result of said comparison means, said setting means sets a higher-velocity driving pattern than the first driving pattern as a driving pattern for driving the motor (Column 3, lines 27-39).

With respect to claim 14, Saito discloses the printing apparatus (Fig. 1) further comprises printing data generation means for scanning a carriage (Fig. 1, element 2) supporting the printhead (Fig. 1, element 1) on a printing medium (Fig. 1, element 11) and converting information transmitted from an external device into printing data complying with an arrangement of the printhead (Column 2, lines 34-67; Column 3, lines 1-13).

With respect to claim 15, Saito discloses the printhead includes an ink-jet printhead (Fig. 1, element 1), which prints by discharging ink (Column 2, lines 34-67; Column 3, lines 1-13).

With respect to claim 17, Saito discloses a printing apparatus (Fig. 1) control method of driving (Fig. 3), on the basis of feedback control, a printing apparatus which prints using a printhead (Fig. 1, element 1), comprising:

- a control information generation step (Fig. 3, element 104) of generating control information for controlling driving of a motor (Fig. 3, element 3) on the basis of a first driving pattern (Fig. 3, element 108a);
- a comparison step (Fig. 6, element 604) of comparing the control information and a threshold for determining an overload on driving of the motor (Column 4, lines 58-67); and
- a setting step (Fig. 6, element 608) of setting a second driving pattern (Fig. 3, element 108a), instead of the first driving pattern on the basis of a comparison processing result of the comparison step (Column 5, lines 1-19).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 10-13, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito (US 5,998,956) in view of Hayami (US 5,940,105).

Saito discloses a first (Fig. 1, element 3) and second motor (Fig. 1, element 6).

However, Saito fails to disclose:

- control of first and second motors, for a torque margin of the second motor  $\geq$  a torque margin of the first motor, said comparison means compares control information for the first motor and a first threshold for determining an overload on driving of the first motor, and said setting means sets a driving pattern for changing a load on driving of the first and second motors on the basis of a comparison result of said comparison means,
- control of first and second motors, for a torque margin of the second motor  $<$  torque margin of the first motor, said comparison means sets a second threshold for determining an overload on driving of the first and second motors, and compares control information for the first motor and the second threshold, and said setting means sets a driving pattern for changing a load on driving of the first and second motors on the basis of a comparison result of said comparison means,
- the second threshold generated by said comparison means satisfies a relation: the first threshold  $>$  the second threshold,
- the first motor includes a DC motor which can be feedback-controlled,

- the printhead includes a printhead which discharges ink by using heat energy, and comprises an electrothermal transducer for generating heat energy to be applied to ink, and
- for a torque margin of the second motor  $<$  a torque margin of the first motor, said comparison means sets a threshold for determining an overload on driving of the first and second motors, and compares control information for the first motor and the set threshold, and said setting means sets a driving pattern for changing a load on driving of the first and second motors on the basis of a comparison result of said comparison means.

Hayami discloses:

- the printhead includes a printhead which discharges ink by using heat energy, and comprises an electrothermal transducer for generating heat energy to be applied to ink (Column 3, lines 13-23) and
- a motor controlling method for an image forming apparatus where “FIGS. 6A and 6B show the drive control circuit of the servo-motor shown in FIG. 5, and as regards the requested position, the same command is given to both of the first and second servo-motors 6a and 6b, and the first servo-motor 6a side effects the feedback position control of the position control loop by the second encoder 23 directly connected to the other end of the first conveying roller 7 and effects the feedback speed control of the speed control loop by the first encoder 22. Also, the second servo-motor 6b side effects the feedback position control of the position control loop by the fourth encoder 26 and



effects the feedback speed control of the speed control loop by the third encoder 25" (Column 6, lines 47-58) and "The target torque of each of the drive control systems of the first and second servo-motors 6a and 6b is designed such that an off-set torque is sent to adding points 52 and 53 so that control may be effected with a torque difference provided between the first and second servo-motors 6a and 6b" (Column 8, lines 1-5).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine the motor controlling method of Hayami in the recording apparatus of Saito. The motivation for doing so would have been "to improve the drive position accuracy of a driving system driven by servo-motor of feedback control" (Column 1, lines 63-65).

2. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito (US 5,998,956) in view of Hayami (US 5,940,105).

Saito discloses a printing apparatus (Fig. 1), which prints using a plurality of motors (Fig. 1, elements 3, 6), a motor controlling device (Fig. 3), and a method of controlling a printing apparatus (Fig. 6).

Saito fails to disclose:

- a printing apparatus which prints using a plurality of motors, wherein a motor driving device which drives a first motor by feedback control and a second motor by open-loop control comprises: control information generation means for generating control information for each motor on the basis of a first driving pattern corresponding to each motor in order to drive the first and second

motors; comparison means for comparing control information of the first motor and a threshold for determining an overload on driving of the first motor; and setting means for setting second driving patterns corresponding to the first and second motors by said control information generation means instead of the first driving pattern on the basis of a comparison result of said comparison means and

- a method of controlling a printing apparatus which prints by driving a first motor by feedback control and a second motor by open-loop control, comprising: a control information generation step of generating control information for each motor on the basis of a first driving pattern corresponding to each motor in order to drive the first and second motors; a comparison step of comparing control information of the first motor and a threshold for determining an overload on driving of the first motor; and a setting step of setting second driving patterns corresponding to the first and second motors instead of the first driving pattern on the basis of a comparison result of the comparison step.

Hayami discloses:

- a motor controlling method for an image forming apparatus where “FIGS. 6A and 6B show the drive control circuit of the servo-motor shown in FIG. 5, and as regards the requested position, the same command is given to both of the first and second servo-motors 6a and 6b, and the first servo-motor 6a side effects the feedback position control of the position control loop by the second

encoder 23 directly connected to the other end of the first conveying roller 7 and effects the feedback speed control of the speed control loop by the first encoder 22. Also, the second servo-motor 6b side effects the feedback position control of the position control loop by the fourth encoder 26 and effects the feedback speed control of the speed control loop by the third encoder 25" (Column 6, lines 47-58) and "The target torque of each of the drive control systems of the first and second servo-motors 6a and 6b is designed such that an off-set torque is sent to adding points 52 and 53 so that control may be effected with a torque difference provided between the first and second servo-motors 6a and 6b" (Column 8, lines 1-5).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to combine the motor controlling method of Hayami in the recording apparatus of Saito. The motivation for doing so would have been "to improve the drive position accuracy of a driving system driven by servo-motor of feedback control" (Column 1, lines 63-65).

### ***Conclusion***

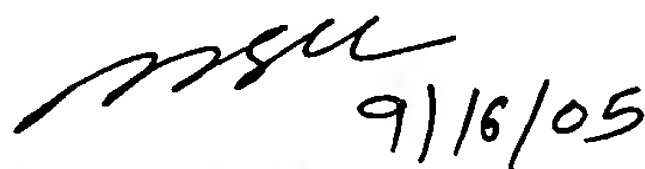
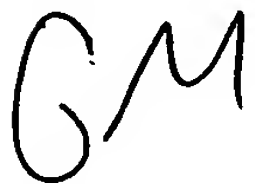
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.

Art Unit: 2853

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GSM  
9/15/2005



**MANISH S. SHAH**  
**PRIMARY EXAMINER**